

EXHIBIT A

Skyhook Wireless, Inc. v. Google Inc.
Case no. 10-cv-11571-RWZ (D. Mass.)

102 Invalidity Chart for Patent: 7,414,988
Prior Art: 7,130,646 (Wang)

Claim element	'988 Patent Claim Language	Anticipatory Language from '646 (Wang)
1	A Wi-Fi location server, comprising:	The '646 patent describes a Wi-Fi location server and databases for accurately determining the position of an end user using a wireless local area network (WLAN). <i>See</i> '646 patent generally, and <i>inter alia</i> , at Title, Abstract, 1:8-14, 4:32-39, and 5:5-7:55.
1a.	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	The '646 patent describes a database of Wi-Fi access points for target areas having a radius on the order of ten miles. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-58, 5:5-7:55 and 6:16-23, 47-57 (describing databases of access points) and 12:58-13:22 (describing access points within target areas, such as Tokyo).
1b.	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	The '646 patent describes a database of substantially all Wi-Fi access points for target areas recorded on a computer usable medium. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-58, 5:5-7:55 and 6:16-23, 47-57 (describing databases of access points) and 8:32-39, 12:58-13:22 (describing access points within target areas, such as Tokyo).
1c.	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	The '646 patent describes that the access points in the databases have identification information and calculated position information. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-58, 4:7-13, 32-37, 5:5-7:55 and 6:16-23, 47-57 and 8:32-39, 12:58-13:22 (describing identifying access points, and using their stored locations).
1d.	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the Wi-Fi access point so that the multiple readings have reference symmetry relative to other Wi-Fi	The '646 patent meets this element. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 4:7-13, 32-37, 5:5-7:55 and 6:16-23, 47-57 and 8:32-39, 12:58-13:22 (describing identifying access points, and calculating the location of the access points, including through multiple readings of signal strength around the access points). (describing identifying access points, and using their stored

Claim element	'988 Patent Claim Language	Anticipatory Language from '646 (Wang)
	access points in the target area and so that the calculation of the position of the Wi-Fi access point avoids arterial bias in the calculated position information; and	locations and “communicating” with Wi-Fi access points in accordance with IEEE 802.11 standards, which require the messages identifying the access points)
1e.	computer-implemented logic to add records to the database for newly-discovered Wi-Fi access points said computer logic including logic to recalculate position information for Wi-Fi access points previously stored in the database to utilize position information for the newly-discovered readings of previously stored Wi-Fi access points.	The '646 patent meets this element. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 4:7-13, 32-37, 5:5-7:55 and 6:6-23, 47-57, 7:60-8:31, and 8:32-39, 9:40-43, 12:10-22, 12:58-13:22 (describing identifying new access points and downloading and calculating updated location information for access points, including depending on whether the information is still accurate and whether the access point has moved).
2	The server of claim 1 further including computer-implemented clustering logic to identify position information based on error prone GPS information.	The '646 patent meets this element. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 6:16-40, 6:50-7:55, 7:60-8:38, 9:36-46 (describing using techniques involving clusters of access points to account for inaccurate GPS information).
3	The server of claim 2 wherein the clustering logic includes logic to determine a weighted centroid position for all position information reported for an access point	The '646 patents describes techniques for using multiple locations of each access point to determine the location of the access point. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 7:60-8:39; 7:3-55.
3a.	and logic to identify position information that exceeds a statistically-based deviation threshold amount away from the centroid position and excludes such deviating position information from the database and from influencing the calculated positions of the Wi-Fi access points.	This element is met. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 7:60-8:39; 7:3-55 (describing weighting factors toward “newer” positions, and excluding signal paths from certain antennas from location calculations).

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102 Invalidity Chart for Patent: 7,433,694
Prior Art: 7,130,646 (Wang)

Claim element	'694 Patent Claim Language	Anticipatory Language from '646 (Wang)
1	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	The '646 patent describes a Wi-Fi location server and databases for accurately determining the position of an end user using a wireless local area network (WLAN). <i>See</i> '646 patent generally, and <i>inter alia</i> , at Title, Abstract, 1:8-14, 4:32-39, 2:50-58, 5:5-7:55 and 6:16-23, 47-57 (describing databases of access points) and 12:58-13:22 (describing access points within target areas, such as Tokyo).
	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	The '646 patent describes a database of substantially all Wi-Fi access points for target areas recorded on a computer usable medium. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-58, 5:5-7:55 and 6:16-23, 47-57 (describing databases of access points) and 8:32-39, 12:58-13:22 (describing access points within target areas, such as Tokyo).
	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	The '646 patent describes that the access points in the databases have identification information and calculated position information. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-58, 4:7-13, 32-37, 5:5-7:55 and 6:16-23, 47-57 and 8:32-39, 12:58-13:22 (describing identifying access points, and using their stored locations and "communicating" with Wi-Fi access points in accordance with IEEE 802.11 standards, which require the messages identifying the access points)
	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the	The '646 patent meets this element. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 4:7-13, 32-37, 5:5-7:55 and 6:16-23, 47-57 and 8:32-39, 12:58-13:22 (describing identifying access points, and calculating the location of the access points,

Claim element	'694 Patent Claim Language	Anticipatory Language from '646 (Wang)
	Wi-Fi access point so that the multiple readings avoid arterial bias in the calculated position information of the Wi-Fi access point,	including through multiple readings of signal strength around the access points).
	and wherein the database records for substantially all Wi-Fi access points in the target area provide reference symmetry within the target area.	The '646 patent meets this element. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 4:7-13, 32-37, 5:5-7:55 and 6:16-23, 47-57 and 8:32-39, 12:58-13:22, Figure 2 (showing access points surrounding a client and describing multiple antennas).
2	The database of claim 1 having database records for a plurality of target areas,	The '646 patent describes storing access point and other information, for local areas and local maps, in a database made available to wireless devices. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-58, 5:5-7:55 and 6:16-23, 47-57 (describing databases of access points) and 8:32-39, 12:11-22, 12:58-13:22 (describing access points within target areas, such as Tokyo).
	said database records being organized by target areas.	The '646 patent describes organizing database records by target areas, such as by city, like Tokyo. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-58, 5:5-7:55 and 6:16-23, 47-57 (describing databases of access points) and 8:32-39, 12:11-22, 12:58-13:22 (describing access points within target areas, such as Tokyo).

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102 Invalidity Chart for Patent: 7,305,245
Prior Art: 7,130,646 (Wang)

Claim element	'245 Patent Claim Language	Anticipatory Language from '646 (Wang)
1	A method of locating a user-device having a Wi-Fi radio, comprising:	The '646 patent describes quickly and accurately determining the position of an end user using a wireless local area network (WLAN). <i>See</i> '646 patent generally, and <i>inter alia</i> , at 1:8-10, 2:30-35, 5:50-53.
	providing a reference database of calculated locations of Wi-Fi access points in a target area;	The '646 patent describes that the access points in the databases have identification information and calculated position information. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-58, 4:7-13, 32-37, 5:5-7:55 and 6:16-23, 47-57 and 8:32-39, 12:58-13:22 (describing identifying access points, and using their stored locations).
	in response to a user application request to determine a location of a user-device having a Wi-Fi radio,	The '646 patent describes a user application requesting a determination of the user's location. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 4:39-57, 12:58-59, 13:3-11.
	triggering the Wi-Fi device to transmit a request to all Wi-Fi access points within range of the Wi-Fi device;	The '646 patent describes triggering the Wi-Fi device to transmit a request to all access points within range through operation in the infrastructure mode of wireless networks such as 802.11. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 4:39-57, 5:48- 6:49, 6:50-59, 7:26-30, 12:58-59, 13:3-11 and Figure 2.
	receiving messages from the Wi-Fi access points within range of the Wi-Fi device,	The '646 patent describes receiving messages from Wi-Fi access points within range of the Wi-Fi device. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:49-51, 4:39-57, 5:48- 6:49, 6:50 - 7:19, 7:26-30, 12:58-59, 13:3-11 and Figure 2.
	each message identifying the Wi-Fi access point sending the message;	The '646 patent discloses messages from Wi-Fi access points identifying the access point sending the message. <i>See</i> '646 patent

Claim element	'245 Patent Claim Language	Anticipatory Language from '646 (Wang)
		generally, and <i>inter alia</i> , at 2:30-35, 43-45, 50-58, 4:7-13, 32-37, 5:5-7:55 and 6:16-23, 47-57, 7:26-30 and 8:32-39, 12:58-13:22. (describing identifying access points, and using their stored locations and “communicating” with Wi-Fi access points in accordance with IEEE 802.11 standards, which require the messages identifying the access points)
	calculating the signal strength of the messages received by the Wi-Fi access points;	The '646 patent describes calculating the signal strength of messages. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 7:20-57, 2:49-55, 6:34-40, 55-59.
	accessing the reference database to obtain the calculated locations for the identified Wi-Fi access points;	The '646 patent describes accessing the database to obtain the calculated locations for the access points. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-3:3, 4:7-13, 32-37, 48-60, 5:5-7:55 and 6:16-23, 47-57 and 8:32-39, 12:58-13:22 (describing identifying access points, and using their stored locations).
	based on the number of Wi-Fi access points identified via received messages, choosing a corresponding location determination algorithm from a plurality of location determination algorithms,	The '646 patent describes choosing a location determination algorithm from a plurality of algorithms based on the number of Wi-Fi access points identified via received messages. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:42- 3:3, 4:32- 38, 6:16-7:19, 5:5-7:55.
	said chosen algorithm being suited for the number of identified Wi-Fi access points;	The '646 patent describes choosing a location determination algorithm best suited for the number of Wi-Fi access points. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:42- 3:3, 4:32- 38, 6:16-7:19, 5:5-7:55.
	using the calculated locations for the identified Wi-Fi access points and the signal strengths of said received messages and the chosen location-determination algorithm to determine the location of the user-device.	The '646 patent describes using the calculated locations of access points received through messages, the choosing a location determination algorithm and signal strengths to calculate the location of the wireless device. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-3:3, 3:23-35, 4:7-13, 22-31, 32-37, 48-60, 5:5-7:55 and 6:16-23, 34-40, 47-59, 7:20-57, 8:32-39, 12:58-13:22 (describing identifying access points, and using their

Claim element	'245 Patent Claim Language	Anticipatory Language from '646 (Wang)
		stored locations).
2	The method of claim 1 wherein the calculated locations for the identified Wi-Fi access points are filtered to determine if the corresponding Wi-Fi access points have moved since the time the information about the Wi-Fi access points was included in the reference database.	This element is met. <i>See</i> '646 patent generally, and <i>inter alia</i> , at '646 patent, 7:60-8:29 (describing determining when access points have moved and updating location information).
4	The method of claim 1 wherein the reference database is located remotely relative to the user-device.	The '646 patent describes that the reference database of access points may be located remotely relative to the Wi-Fi enabled user device. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 4:48-52. '646 patent, 4:48-52.
5	The method of claim 1 wherein the location of the user device is provided with latitude and longitude coordinates.	The '646 patent describes that the location of the user device may be provided with latitude and longitude coordinates. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 4:7-21.
6	The method of claim 1 wherein the plurality of location-determination algorithms includes a simple signal strength weighted average model.	The '646 patent describes that the location determination algorithms include a simple signal strength weighted average model. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:42-4:7, 5:6:50-69, 7:2-14, 7:21-35.
8	The method of claim 1 wherein the plurality of location-determination algorithms includes a triangulation technique.	The '646 patent describes a nearest neighbor model for location determination. <i>See</i> '646 patent generally, and <i>inter alia</i> , at '646 patent, 2:56-3:3, 6:50-7:57 and Figure 2.

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102 Invalidity Chart for Patent: 7,474,897
Prior Art: 7,130,646 (Wang)

Claim element	'897 Patent Claim Language	Anticipatory Language from '646 (Wang)
1	In a location-based services system for WiFi-enabled devices, a method of calculating the position of WiFi-enabled devices comprising the acts of:	The '646 patent describes quickly and accurately determining the position of an end user using a wireless local area network (WLAN). <i>See</i> '646 patent generally, and <i>inter alia</i> , at 1:8-10, 2:30-35, 5:50-53, 13:10-22.
1a.	a WiFi-enabled device communicating with WiFi access points within range of the WiFi-enabled device so that observed WiFi access points identify themselves;	The '646 patent describes a mobile device communicating with wireless access points through operation in the infrastructure mode of wireless networks such as 802.11, and messages from Wi-Fi access points identifying the access point sending the message. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:30-60, 4:7-13, 32-57, 5:48-7:30, 8:32-39, 12:58-13:22, Figure 1 and Figure 2 (describing, for example, identifying access points, and using their stored locations and "communicating" with Wi-Fi access points in accordance with IEEE 802.11 standards, which require the messages identifying the access points).
1b.	accessing a reference database to obtain information specifying a recorded location for each observed WiFi access point;	The '646 patent describes that the access points in the databases have identification information and calculated position information, and describes accessing the database to obtain the calculated locations for the access points. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:50-3:3, 4:7-13, 32-37, 48-60, 5:5-7:55 and 6:16-23, 47-57 and 8:32-39, 12:58-13:22 (describing identifying access points, and using their stored locations).
1c.	using the recorded location information for each of the observed WiFi access points in conjunction with predefined rules to determine whether an observed WiFi access point should be included or excluded	The '646 patent describes choosing which WiFi access points to access, in conjunction with using recorded location information for observed access points. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:42-55, 6:6-8:39 and 13:23-28.

Claim element	'897 Patent Claim Language	Anticipatory Language from '646 (Wang)
	from a set of WiFi access points;	
1d.	using the recorded location information of only the WiFi access points included in the set and omitting the recorded location information of the excluded WiFi access points to calculate the geographical position of the WiFi-enabled device.	The '646 patent describes choosing which WiFi access points to access, in conjunction with using recorded location information for observed access points to determine position of a wireless device. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:42-55, 6:6-8:39 and 13:23-28.
2	The method of claim 1 further including recording signal strength information for WiFi access points included in the set	The '646 patent describes choosing which WiFi access points to access and calculating the signal strength of messages from WiFi access point. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 7:20-57, 2:42-67, 6:6-8:39 and 13:23-28.
	and using the signal strength information when calculating the geographical position of the WiFi-enabled device.	The '646 patent describes choosing which WiFi access points to access and calculating the signal strength of messages from WiFi access point to determine geographical position. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 7:20-57, 2:42-3:3, 6:6-8:39 and 13:23-28.
3	The method of claim 1 wherein the predefined rules include rules to determine a reference point and to compare the recorded location information for each of the observed WiFi access points to the reference point,	The '646 describes choosing a Wi-Fi access point based on the distance of the wireless device from the access point. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:42-55 and 7:20-35.
	and wherein WiFi access points having a recorded location within a predefined threshold distance of the reference point are included in the set and wherein WiFi access points having a recorded location in excess of the predefined threshold distance of the reference point are excluded from the set.	The '646 describes choosing a Wi-Fi access point based on the distance of the wireless device from the access point. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:42-55 and 7:20-35.

Claim element	'897 Patent Claim Language	Anticipatory Language from '646 (Wang)
4	The method of claim 3 wherein the reference point is determined by identifying a cluster of WiFi access points and determining an average position of the WiFi access points in the cluster.	The '646 describes choosing a set of Wi-Fi access points based on their relative distance and distance from the wireless device, and determining their average distance. <i>See</i> '646 patent generally, and <i>inter alia</i> , at 2:42-3:3 and 7:20-35.

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102 Invalidity Chart for Patent: 7,414,988
Prior Art: 7,257,411 (Gwon, et al.)

Claim element	'988 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
1	A Wi-Fi location server, comprising:	The '411 patent describes accessing a remotely-located database of Wi-Fi access points to determine location. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:54-5:8, 8:2-4, 8:62-65, 15:43-44, 19:5-12, 19:15-35, 21:18-23.
	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	The '411 patent describes creating a database of Wi-Fi access points for any geographic area from large to small, including the ocean or a region. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 4:54-5:8, 8:2-4, 8:62-65, 15:43-44, 19:5-12, 19:15-35, 21:18-23, and Fig. 1.
	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	The '411 patent describes creating a database of Wi-Fi access points for a geographic area by recording Wi-Fi access points in an initial data collection of an area for as many as all of the transmitters throughout the area, and storing the database on a computer-readable medium such as a disk or DRAM. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 3:64-4:3, 4:54-5:8, 8:2-4, 8:62-65, 15:43-44, 19:5-12, 19:15-35, 21:18-23.
	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	The '411 patent describes creating a database of the characteristics of Wi-Fi access points, including the identity and signal strengths of the access points at various locations that is used to calculate position information. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 1:32-34, 1:43-49, 3:38-4:40, 4:54-5:4, 5:9-18, 8:62-65, 13:6-8, 15:28-30, 19:5-9, 19:17-20, 20:35-55, 21:18-23, and Fig. 2 (describing "communicating" with Wi-Fi access points in accordance with IEEE 802.11 standards, which require messages to identify the access points). Wi-Fi access points broadcast messages containing unique identifiers.

Claim element	'988 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the Wi-Fi access point so that the multiple readings have reference symmetry relative to other Wi-Fi access points in the target area and so that the calculation of the position of the Wi-Fi access point avoids arterial bias in the calculated position information; and	The '411 patent describes gathering data for an entire area, taking geographical structural subregional features into account, and creating a symmetrical readings. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:36-4:9, 4:54-5:8, 7:6-28, 7:37-48, 10:40—20:33 (describing various techniques to achieve enhanced location data in data collection), and Fig. 1 .
	computer-implemented logic to add records to the database for newly-discovered Wi-Fi access points said computer logic including logic to recalculate position information for Wi-Fi access points previously stored in the database to utilize position information for the newly-discovered readings of previously stored Wi-Fi access points.	The '411 patent describes protocols for gathering data for an entire area and adding the records to a database, updating the recorded information over time, and adding information. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 4:4-5:8, 7:6-28, 7:37-60, 18:34-19:12, and 20:13-33.
2	The server of claim 1 further including computer-implemented clustering logic to identify position information based on error prone GPS information.	The '411 patent describes using clustering logic and other techniques to improve error-prone location estimates. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 2:3-14, 4:33-57, 5:9-34, 5:44-67, 8:2-5, 8:47-57, 17:26-44, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8 (showing the use of some access points but not others when determining location), Fig. 4, Fig. 5, Fig. 7, Fig. 9, Fig. 12, and Fig. 13.
3	The server of claim 2 wherein the clustering logic includes logic to determine a weighted centroid position for all position information reported for an access point	The '411 patent describes using clustering logic and other techniques to improve error-prone location estimates. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 2:3-14, 4:33-64, 5:9-34, 5:44-6:56, 8:2-5, 8:47-57, 14:29-36, 17:26-44, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig.

Claim element	'988 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
		8 (showing the use of some access points but not others when determining location), Figs. 3-5, Fig. 7, Fig. 9, Fig. 12, and Fig. 13.
	and logic to identify position information that exceeds a statistically-based deviation threshold amount away from the centroid position and excludes such deviating position information from the database and from influencing the calculated positions of the Wi-Fi access points.	The '411 patent describes using filtering based on expected centroid and threshold distances, and other outlier-filtering techniques to location data. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 2:3-14, 4:33-57, 5:9-34, 5:44-67, 8:2-5, 8:47-57, 14:29-36, 17:26-44, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8 (showing the use of some access points but not others when determining location), Fig. 4, Fig. 5, Fig. 7, Fig. 9, Fig. 12, and Fig. 13.

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102 Invalidity Chart for Patent: 7,433,694
Prior Art: 7,257,411 (Gwon, et al.)

Claim element	'694 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
1	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	The '411 patent describes creating a database of Wi-Fi access points for any geographic area from large to small, including the ocean or a region. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 4:54-5:8, 8:2-4, 8:62-65, 15:43-44, 19:5-12, 19:15-35, 21:18-23.
	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	The '411 patent describes creating a database of Wi-Fi access points for a geographic area by recording Wi-Fi access points in an initial data collection of an area for as many as all of the transmitters throughout the area, and storing the database on a computer-readable medium such as a disk or DRAM. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 3:64-4:3, 4:54-5:8, 8:2-4, 8:62-65, 15:43-44, 19:5-12, 19:15-35, 21:18-23, and Fig. 1.
	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	The '411 patent describes creating a database of the characteristics of Wi-Fi access points, including the identity and signal strengths of the access points at various locations that is used to calculate position information. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 1:32-34, 1:43-49, 3:38-4:40, 5:9-18, 8:62-65, 13:6-8, 15:28-30, 19:5-9, 19:17-20, 20:35-55, 21:18-23, and Fig. 2 (describing "communicating" with Wi-Fi access points in accordance with IEEE 802.11 standards, which require messages to identify the access points). Wi-Fi access points broadcast messages containing unique identifiers.
	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the	The '411 patent describes gathering data for an entire area, taking geographical structural subregional features into account to improve the accuracy of the readings. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 4:54-5:8, 7:6-

Claim element	'694 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
	Wi-Fi access point so that the multiple readings avoid arterial bias in the calculated position information of the Wi-Fi access point,	28, 7:37-48, 10:40—20:33 (describing various techniques to achieve enhanced location data in data collection) .
	and wherein the database records for substantially all Wi-Fi access points in the target area provide reference symmetry within the target area.	The '411 patent describes gathering data for an entire area, taking geographical structural subregional features into account, and creating a symmetrical readings. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 4:54-5:8, 7:6-28, 7:37-48, 10:40—20:33 (describing various techniques to achieve enhanced location data in data collection) .
2	The database of claim 1 having database records for a plurality of target areas,	The '411 patent describes gathering data for a plurality of areas. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 4:54-5:8, 7:50-60, 8:2-4, 8:62-65, 15:43-44, 19:5-12, 19:15-35, 21:18-23.
	said database records being organized by target areas.	The '411 patent describes gathering data for a plurality of areas or subregions and creating a database based on characteristics of the data collected in each area of collection, including information about location of the collection area. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:38-52, 4:54-5:8, 5:44-52, 7:50-60, 8:2-4, 8:62-65, 15:43-44, 19:5-12, 19:15-20:11, 21:18-23.

Skyhook Wireless, Inc. v. Google Inc.
Case no. 10-cv-11571-RWZ (D. Mass.)

102 Invalidity Chart for Patent: 7,474,897
Prior Art: 7,257,411 (Gwon, et al.)

Claim element	'897 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
1	In a location-based services system for WiFi-enabled devices, a method of calculating the position of WiFi-enabled devices comprising the acts of:	The '411 patent describes a method of providing location based services and determining the location of an Wi-Fi enabled receiver by communicating with Wi-Fi access points. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 1:7-23, 1:43-49, 3:24-33, and 19:30-35.
1a.	a WiFi-enabled device communicating with WiFi access points within range of the WiFi-enabled device so that observed WiFi access points identify themselves;	The '411 patent describes communication between a mobile device with Wi-Fi capability to Wi-Fi access points within range of the device. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 1:32-34, 1:43-49, 2:60-3:35, 4:22-32, 5:9-18, 19:17-20, 20:35-39, and Fig. 2 (describing "communicating" with Wi-Fi access points in accordance with IEEE 802.11 standards, which require messages to identify the access points). Wi-Fi access points broadcast messages containing unique identifiers.
1b.	accessing a reference database to obtain information specifying a recorded location for each observed WiFi access point;	The '411 patent describes accessing the database to determine location based on signals received by mobile devices from access points, where the reference database stores previously recorded information of location determination algorithms that calculate the signal strength of messages received by base units used for data collection. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:10-19, 4:65-5:4, 5:36-42, 8:2-4, 8:62-65, 15:43-44, 19:5-9, 19:15-35, 21:18-23.
1c.	using the recorded location information for each of the observed WiFi access points in conjunction with predefined rules to determine whether an observed WiFi access point should be included or excluded from a set of WiFi access points;	The '411 patent describes filtering the data of one or more access points based in part on algorithms that analyze information such as recorded location. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 8:2-5, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8 (showing the use of some access points but not others when determining location), Fig. 9, Fig. 12, and Fig. 13.

Claim element	'897 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
1d.	using the recorded location information of only the WiFi access points included in the set and omitting the recorded location information of the excluded WiFi access points to calculate the geographical position of the WiFi-enabled device.	The '411 patent describes locating a mobile device using data related to recorded locations only after it is filtered based in part on algorithms that analyze information such as characteristics of recorded location. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 8:2-5, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8 (showing the use of some access points but not others when determining location), Fig. 9, Fig. 12, and Fig. 13.
2	The method of claim 1 further including recording signal strength information for WiFi access points included in the set	The '411 patent describes recording signal strength information for some Wi-Fi access points. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 7:61-64, 8:2-5, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8 (showing the use of some access points but not others when determining location), Fig. 9, Fig. 12, and Fig. 13.
	and using the signal strength information when calculating the geographical position of the WiFi-enabled device.	The '411 patent describes recording signal strength information for some Wi-Fi access points and using it to determine the location of the Wi-Fi device. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 7:61-64, 8:2-5, 13:7-16:67 and 17:1-18:33 (separate techniques for using signal strength information to determine geographical location), 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8 (showing the use of some access points but not others when determining location), Fig. 9, Fig. 12, and Fig. 13.
3	The method of claim 1 wherein the predefined rules include rules to determine a reference point and to compare the recorded location information for each of the observed WiFi access points to the reference point,	The '411 patent describes the filtering the data of one or more access points based in part on algorithms that analyze information such as distance of the recorded locations from a reference point. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 5:44-67, 8:2-5, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8, Fig. 9, Fig. 12, and Fig. 13.

Claim element	'897 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
	and wherein WiFi access points having a recorded location within a predefined threshold distance of the reference point are included in the set and wherein WiFi access points having a recorded location in excess of the predefined threshold distance of the reference point are excluded from the set.	The '411 patent describes locating a mobile device using data related to recorded locations only after it is filtered based in part on algorithms that analyze information such as distance from recorded location. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 5:44-67, 8:2-5, 8:47-57, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8 (showing the use of some access points but not others when determining location), Fig. 7, Fig. 9, Fig. 12, and Fig. 13.
4	The method of claim 3 wherein the reference point is determined by identifying a cluster of WiFi access points and determining an average position of the WiFi access points in the cluster.	The '411 patent describes locating a mobile device using data related to recorded locations only after it is filtered based in part on algorithms, including cluster algorithms, that analyze information such as distance from recorded location. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 5:44-67, 8:2-5, 8:47-57, 17:26-44, 19:23-32, 19:40-43, 19:57-20:10, 20:13-19, 20:63-21:3, Fig. 8 (showing the use of some access points but not others when determining location), Fig. 5, Fig. 7, Fig. 9, Fig. 12, and Fig. 13.

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102 Invalidity Chart for Patent: 7,305,245
Prior Art: 7,257,411 (Gwon, et al.)

Claim element	'245 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
1	A method of locating a user-device having a Wi-Fi radio, comprising:	The '411 patent describes a method of determining the location of an end-user mobile receiver by communicating with Wi-Fi access points. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 1:7-23, 1:43-49, 3:24-33, and 19:30-35.
	providing a reference database of calculated locations of Wi-Fi access points in a target area;	The '411 patent describes a reference database that stores location information related to algorithms for determining location based on the combination of estimates of location from multiple reference sources. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 3:11-21 and 4:54-64.
	in response to a user application request to determine a location of a user-device having a Wi-Fi radio,	The '411 patent describes user applications installed on a user device initiating a location request. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 1:24-39 and 19:15-35.
	triggering the Wi-Fi device to transmit a request to all Wi-Fi access points within range of the Wi-Fi device;	The '411 patent describes communication between a mobile device with Wi-Fi capability to Wi-Fi access points within range of the device. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 5:9-18 and Fig. 2 (showing a mobile unit communicating with access points on an 802.11 wireless network).
	receiving messages from the Wi-Fi access points within range of the Wi-Fi device,	The '411 patent describes communication between a mobile device with Wi-Fi capability to Wi-Fi access points within range of the device. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 1:43-49, 5:9-18, and Fig. 2 (showing a mobile unit communicating with access points on an 802.11 wireless network).

Claim element	'245 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
	each message identifying the Wi-Fi access point sending the message;	The '411 patent describes communication between a mobile device with Wi-Fi capability to Wi-Fi access points within range of the device. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 1:32-34, 1:43-49, 4:22-32, 5:9-18, 19:17-20, 20:35-39, and Fig. 2 (describing "communicating" with Wi-Fi access points in accordance with IEEE 802.11 standards, which require messages to identify the access points). Wi-Fi access points broadcast messages containing unique identifiers.
	calculating the signal strength of the messages received by the Wi-Fi access points;	The '411 patent describes location determination algorithms that calculate the signal strength of messages received by base units, where such signal strength information based on calculations is stored in the reference database. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:10-19, 4:65-5:4, 5:36-42, 15:43-44, and 19:15-35.
	accessing the reference database to obtain the calculated locations for the identified Wi-Fi access points;	The '411 patent describes accessing the database to determine location based on signals received by mobile devices from access points, where the reference database stores previously recorded information of location determination algorithms that calculate the signal strength of messages received by base units used for data collection. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:10-19, 4:65-5:4, 5:36-42, 8:62-65, 15:43-44, 19:15-35, 21:18-23.
	based on the number of Wi-Fi access points identified via received messages, choosing a corresponding location determination algorithm from a plurality of location determination algorithms,	The '411 patent describes the selective use of one or more algorithms determine location, based in part on the number of access points. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 20:63-21:3, and Fig. 9.
	said chosen algorithm being suited for the number of identified Wi-Fi access points;	The '411 patent describes the selective use of one or more algorithms determine location, based in part on the number of access points.

Claim element	'245 Patent Claim Language	Anticipatory Language from '411 (Gwon et al.)
		<i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, 20:63-21:8, and Fig. 9.
	using the calculated locations for the identified Wi-Fi access points and the signal strengths of said received messages and the chosen location-determination algorithm to determine the location of the user-device.	The '411 patent describes a user device using signal strengths of messages received from access points, choosing a location determination algorithm, and calculating the location of the wireless device based on signal strengths. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:33-57, 5:9-34, and 19:17-27.
2	The method of claim 1 wherein the calculated locations for the identified Wi-Fi access points are filtered to determine if the corresponding Wi-Fi access points have moved since the time the information about the Wi-Fi access points was included in the reference database.	The '411 patent describes filtering the location information in the database, in particular for predicted movement and to remove unexpected data. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 5:35-50, 6:43-7:3, and 8:2-15.
4	The method of claim 1 wherein the reference database is located remotely relative to the user-device.	The '411 patent describes storing the reference database locally. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 5:7-8, 5:9-22, and Fig. 2.
5	The method of claim 1 wherein the location of the user device is provided with latitude and longitude coordinates.	The '411 patent describes providing the location of the device in coordinates. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 6:1-54.
6	The method of claim 1 wherein the plurality of location-determination algorithms includes a simple signal strength weighted average model.	The '411 patent describes modeling and determining locations using the weighted average of detected signal strengths. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 4:10-29 and 19:17-29.
8	The method of claim 1 wherein the plurality of location-determination algorithms includes a triangulation technique.	The '411 patent describes modeling and determining locations using a triangulation technique. <i>See</i> '411 patent generally, and <i>inter alia</i> , at 8:22-36 and 20:52-62.

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102 Invalidity Chart for Patent: 7,474,897
Prior Art: 7,389,114 (Ju et al.)

Claim element	'897 Patent Claim Language	Anticipatory Language from '114 (Ju et al.)
1	In a location-based services system for WiFi-enabled devices, a method of calculating the position of WiFi-enabled devices comprising the acts of:	The '114 patent describes a system for calculating the position of Wi-Fi devices. See '114 patent generally, and <i>inter alia</i> , at 2:15-17, Abstract.
1a.	a WiFi-enabled device communicating with WiFi access points within range of the WiFi-enabled device so that observed WiFi access points identify themselves;	The '114 patent describes communicating with Wi-Fi access points which identify themselves. See '114 patent generally, and <i>inter alia</i> , at 2:26-44, 3:42-60, and 4:22-45, 5:62-6:14 (describing communicating with Wi-Fi access points in accordance with IEEE 802.11 standards, which require messages indentifying the access points).
1b.	accessing a reference database to obtain information specifying a recorded location for each observed WiFi access point;	The '114 patent describes accessing the database to determine location based on observed access points, where the reference database stores previously recorded location information. See '114 patent generally, and <i>inter alia</i> , at 2:26-54, 3:42-60, 4:22-45, 5:62-6:14 and Fig. 6.
1c.	using the recorded location information for each of the observed WiFi access points in conjunction with predefined rules to determine whether an observed WiFi access point should be included or excluded from a set of WiFi access points;	The '114 patent describes using the recorded information in conjunction with observational data and algorithms to determine which Wi-Fi access points to include or exclude in a set. See '114 patent generally, and <i>inter alia</i> , at 2:26-54 and 5:60-7:45.
1d.	using the recorded location information of only the WiFi access points included in the set and omitting the recorded location information of the excluded WiFi access points to calculate the geographical position of the WiFi-enabled device.	The '114 patent describes using recorded location information only for access points within the predefined rules. See '114 patent generally, and <i>inter alia</i> , at 2:26-54 and 6:48-7:45

Claim element	'897 Patent Claim Language	Anticipatory Language from '114 (Ju et al.)
2	The method of claim 1 further including recording signal strength information for WiFi access points included in the set	The '114 patent describes recording signal strength information for Wi-Fi access points included in a set. See '114 patent generally, and <i>inter alia</i> , at 2:26-54, 4:46-52, and 6:48-7:45
	and using the signal strength information when calculating the geographical position of the WiFi-enabled device.	The '114 patent describes using signal strength information to calculate position of Wi-Fi enabled devices. See '114 patent generally, and <i>inter alia</i> , at 2:26-67, 3:1-5, 4:46-52, 5:60-6:14, and 6:48-8:21.
3	The method of claim 1 wherein the predefined rules include rules to determine a reference point and to compare the recorded location information for each of the observed WiFi access points to the reference point,	The '114 patent describes rules to determine recorded location information relative to a reference point. See '114 patent generally, and <i>inter alia</i> , at 2:26-67, 3:1-5, 4:46-52, 6:48-8:21.
	and wherein WiFi access points having a recorded location within a predefined threshold distance of the reference point are included in the set and wherein WiFi access points having a recorded location in excess of the predefined threshold distance of the reference point are excluded from the set.	The '114 patent describes rules to determine the relevancy of recorded locations based upon the distance from a reference point. See '114 patent generally, and <i>inter alia</i> , at 2:26-67, 3:1-5, 4:46-52, 6:48-8:21.
4	The method of claim 3 wherein the reference point is determined by identifying a cluster of WiFi access points and determining an average position of the WiFi access points in the cluster.	The '114 patent describes using averaging of readings from multiple points to determine an average position. See '114 patent generally, and <i>inter alia</i> , at 6:63-8:20.

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102 Invalidity Chart for Patent: 7,474,897

Prior Art: Ming-Hui Jin, *802.11-based Positioning System for Context Aware Applications*,
GLOBECOM (2003)

Claim element	'897 Patent Claim Language	Anticipatory Language from Jin Reference
1	In a location-based services system for WiFi-enabled devices, a method of calculating the position of WiFi-enabled devices comprising the acts of:	The Jin reference describes a method of locating mobile objects using multiple Wi-Fi access points. <i>See</i> Jin generally, and <i>inter alia</i> , 929.
1a.	a WiFi-enabled device communicating with WiFi access points within range of the WiFi-enabled device so that observed WiFi access points identify themselves;	The Jin reference describes communications between WiFi-enabled device and WiFi access points so that observed WiFi access points identify themselves. <i>See</i> Jin generally, and <i>inter alia</i> , 929 (describing signals traveling between sender and receivers); 929-30 (describing identifying individual power strength signatures for each position, the IEEE 802.11 protocol requires identification of access points)..
1b.	accessing a reference database to obtain information specifying a recorded location for each observed WiFi access point;	The Jin reference describes querying the database to obtain location information for a Wi-Fi access point. <i>See</i> Jin generally, and <i>inter alia</i> , 930 (describing the database that stores power strength signatures of position in the service region); 931 (describing querying the database to obtain position information).
1c.	using the recorded location information for each of the observed WiFi access points in conjunction with predefined rules to determine whether an observed WiFi access point should be included or excluded from a set of WiFi access points;	The Jin reference describes using recorded location information for observed Wi-Fi access points to decide whether a Wi-Fi access point should be excluded from a set. <i>See</i> Jin generally, and <i>inter alia</i> , 930 (discussing comparing power signatures in a set to a reference point to maintain a finite set of power signatures for use in position calculation); <i>see also</i> 930-31; Fig. 2.
1d.	using the recorded location information of only the WiFi access points included in the set and omitting the recorded location information of the excluded WiFi access points to calculate the geographical position of the WiFi-enabled	The Jin reference describes using recorded location information for observed Wi-Fi access points to decide whether a Wi-Fi access point should be excluded from a set. <i>See</i> Jin generally, and <i>inter alia</i> , 930 (discussing comparing power signatures in a set to a reference point to maintain a finite set of power signatures for use in position calculation); <i>see also</i> 930-31; Fig. 3.

Claim element	'897 Patent Claim Language	Anticipatory Language from Jin Reference
	device.	
2	The method of claim 1 further including recording signal strength information for WiFi access points included in the set	The Jin reference describes collecting Wi-Fi access point signal strengths. <i>See</i> Jin generally, and <i>inter alia</i> , 930 (discussing signal strength measurements received from Wi-Fi access points); <i>see also</i> Fig. 2.
	and using the signal strength information when calculating the geographical position of the WiFi-enabled device.	The Jin reference describes using the signal strength information when calculating the geographical position of the WiFi-enabled device. <i>See</i> Jin generally, and <i>inter alia</i> , 931-32 (describing the use of signal power strength of the senders nearby to locate mobile terminals and the positioning procedure).
3	The method of claim 1 wherein the predefined rules include rules to determine a reference point and to compare the recorded location information for each of the observed WiFi access points to the reference point,	The Jin reference describes using recorded location information for observed Wi-Fi access points to decide whether a Wi-Fi access point should be excluded from a set. <i>See</i> Jin generally, and <i>inter alia</i> , 930 (discussing comparing power signatures in a set to a reference point to maintain a finite set of power signatures for use in position calculation); <i>see also</i> 930-31; Fig. 2.
	and wherein WiFi access points having a recorded location within a predefined threshold distance of the reference point are included in the set and wherein WiFi access points having a recorded location in excess of the predefined threshold distance of the reference point are excluded from the set.	The Jin reference describes using recorded location information for observed Wi-Fi access points to decide whether a Wi-Fi access point should be excluded from a set. <i>See</i> Jin generally, and <i>inter alia</i> , 930 (discussing comparing power signatures in a set to a reference point to maintain a finite set of power signatures for use in position calculation); <i>see also</i> 930-31; Fig. 2.
4	The method of claim 3 wherein the reference point is determined by identifying a cluster of WiFi access points and determining an average position of the WiFi access points in the cluster.	The Jin reference describes identifying a cluster of Wi-Fi access points and determining an average position of the Wi-Fi access points in the cluster. <i>See</i> Jin generally, and <i>inter alia</i> , 930 (discussing the average point in the cluster of signal strength readings); 930-31, Fig. 3 (finding cluster of signal strength measurements and its average).

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102 Invalidity Chart for Patent: 7,414,988
Prior Art: PlaceLab and Corresponding References

Claim element	'988 Patent Claim Language	Each element is found in the PlaceLab product/initiative as shown by the Prior Art Reference Nos. 49,65, 66
1	A Wi-Fi location server, comprising:	PlaceLab provides a Wi-Fi location server and databases for accurately determining the position of an end user using a wireless local area network (WLAN). <i>See generally</i> , and <i>inter alia</i> , Reference 49 at Sections 1, 2, 4.1; Reference 65 at Pages 1-2; Reference 66 at Section 3 (describing the database of Wi-Fi access points used to provide location services to users).
1a.	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	PlaceLab provides a database of Wi-Fi access points for target areas having a radius on the order of ten miles. <i>See generally</i> , and <i>inter alia</i> , Reference 65 at Page 2, Reference 49 in Sections 1, 2; Reference 66 in Sections 3.3 (each describing collecting Wi-Fi access point information for large geographic areas or cities/towns).
1b.	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	PlaceLab provided a database of all Wi-Fi access points for target areas. <i>See generally</i> , and <i>inter alia</i> , Reference 49 at Section 4.1, Reference 65 at page 1, Reference 66 at Section 3 (describing storing all Wi-Fi access points in the target area through war-driving and other techniques to obtain them).
1c.	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	PlaceLab provides a database of Wi-Fi access points that identifies the access point and provides calculated position information for the access points. <i>See generally</i> , and <i>inter alia</i> , Reference 65 at page 1, Reference 49 at Section 2, Reference 66 at Section 3.
1d.	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the	The PlaceLab initiative uses databases of access points collected by war driving or other techniques around an access point and recording multiple readings at different locations and averaging them or doing other statistical processing of the data.

Claim element	'988 Patent Claim Language	Each element is found in the PlaceLab product/initiative as shown by the Prior Art Reference Nos. 49,65, 66
	Wi-Fi access point so that the multiple readings have reference symmetry relative to other Wi-Fi access points in the target area and so that the calculation of the position of the Wi-Fi access point avoids arterial bias in the calculated position information; and	<i>See generally</i> , and <i>inter alia</i> , Reference 49, Sections 1, 2 and 4.1; Reference 65 at page 2, Reference 66 at Section 3.
1e.	computer-implemented logic to add records to the database for newly-discovered Wi-Fi access points said computer logic including logic to recalculate position information for Wi-Fi access points previously stored in the database to utilize position information for the newly-discovered readings of previously stored Wi-Fi access points.	The PlaceLab initiative uses databases of access points collected by war driving or other techniques that can be updated with newly discovered or new readings. <i>See generally</i> , and <i>inter alia</i> , Reference 49, Sections 1, 2 and 4.1; Reference 65 at page 2, Reference 66 at Section 3.
2	The server of claim 1 further including computer-implemented clustering logic to identify position information based on error prone GPS information.	PlaceLab uses techniques to identify position information and statistically process access point information for access points in geographic areas based on error prone GPS information. <i>See generally</i> , and <i>inter alia</i> , at Reference 65 at page 2, Reference 49 at Section 4.1 and Reference 66 at Section 3.
3	The server of claim 2 wherein the clustering logic includes logic to determine a weighted centroid position for all position information reported for an access point	PlaceLab uses weighted average position and other statistical techniques to identify position. <i>See generally</i> , and <i>inter alia</i> , at Reference 65 at page 2, Reference 49 at Section 4.1 and Reference 66 at Section 3.
3a.	and logic to identify position information that exceeds a statistically-based deviation threshold amount away from the centroid position and excludes such deviating position	PlaceLab uses weighted average position and other statistical techniques to identify relevant position information from among the position information for access points, for example when an access point reading is in a different geographic area. <i>See generally</i> , and <i>inter alia</i> , at Reference 65 at page 2,

Claim element	'988 Patent Claim Language	Each element is found in the PlaceLab product/initiative as shown by the Prior Art Reference Nos. 49,65, 66
	information from the database and from influencing the calculated positions of the Wi-Fi access points.	Reference 49 at Section 4.1 and Reference 66 at Section 3.

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102 Invalidity Chart for Patent: 7,433,694
Prior Art: PlaceLab and Corresponding References

Claim element	'694 Patent Claim Language	Each element is found in the PlaceLab product/initiative as shown by the Prior Art Reference Nos. 49,65, 66
1	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	PlaceLab provides a Wi-Fi and database for accurately determining the position of an end user using a wireless local area network (WLAN). <i>See</i> generally, and <i>inter alia</i> , Reference 49 at Sections 1, 2, 4.1; Reference 65 at Pages 1-2; Reference 66 at Section 3 (describing the database of Wi-Fi access points used to provide location services to users).
	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	PlaceLab provides a database of Wi-Fi access points for all access points in a target areas having a radius on the order of ten miles. <i>See</i> generally, and <i>inter alia</i> , Reference 65 at Pages 1, 2, Reference 49 in Sections 1, 2, 4.1; Reference 66 in Sections 3 (each describing collecting Wi-Fi access point information for large geographic areas or cities/towns).
	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	PlaceLab provides a database of Wi-Fi access points that identifies the access point and provides calculated position information for the access points. <i>See</i> generally, and <i>inter alia</i> , Reference 65 at page 1, Reference 49 at Section 2, Reference 66 at Section 3.
	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the Wi-Fi access point so that the multiple readings avoid arterial bias in the calculated position information of the Wi-Fi access	The PlaceLab initiative uses databases of access points collected by war driving or other techniques around an access point and recording multiple readings at different locations and averaging them or doing other statistical processing of the data. <i>See</i> generally, and <i>inter alia</i> , Reference 49, Sections 1, 2 and 4.1; Reference 65 at page 2, Reference 66 at Section 3.

Claim element	'694 Patent Claim Language	Each element is found in the PlaceLab product/initiative as shown by the Prior Art Reference Nos. 49,65, 66
	point,	
	and wherein the database records for substantially all Wi-Fi access points in the target area provide reference symmetry within the target area.	The PlaceLab initiative uses databases of access points that provide symmetry with a target area. <i>See generally</i> , and <i>inter alia</i> , Reference 49, Sections 1, 2 and 4.1; Reference 65 at page 2, Reference 66 at Section 3.
2	The database of claim 1 having database records for a plurality of target areas,	PlaceLab provides a database of Wi-Fi access points for all access points in a target areas having a radius on the order of ten miles. <i>See generally</i> , and <i>inter alia</i> , Reference 65 at Pages 1, 2, Reference 49 in Sections 1, 2, 4.1; Reference 66 in Sections 3 (each describing collecting Wi-Fi access point information for large geographic areas or cities/towns).
	said database records being organized by target areas.	PlaceLab provides a database of Wi-Fi access that is described as being organized by target area. <i>See generally</i> , and <i>inter alia</i> , Reference 65 at Pages 1, 2, Reference 49 in Sections 1, 2, 4.1; Reference 66 in Sections 3 (each describing collecting Wi-Fi access point information for large geographic areas or cities/towns).

Skyhook Wireless, Inc. v. Google Inc.
Case no. 10-cv-11571-RWZ (D. Mass.)

102 Invalidity Chart for Patent: 7,474,897
Prior Art: 7,130,646 (Wang)

Claim element	'897 Patent Claim Language	Each element is found in the PlaceLab product/initiative as shown by the Prior Art Reference Nos. 49,65, 66
1	In a location-based services system for WiFi-enabled devices, a method of calculating the position of WiFi-enabled devices comprising the acts of:	PlaceLab provides a Wi-Fi and database for accurately determining the position of an end user using a wireless local area network (WLAN). <i>See</i> generally, and <i>inter alia</i> , Reference 49 at Sections 1, 2, 4.1; Reference 65 at Pages 1-2; Reference 66 at Section 3 (describing the database of Wi-Fi access points used to provide location services to users).
1a.	a WiFi-enabled device communicating with WiFi access points within range of the WiFi-enabled device so that observed WiFi access points identify themselves;	PlaceLab communicates with Wi-Fi access points which identify themselves. <i>See</i> generally, and <i>inter alia</i> , Reference 49 at Sections 1, 2, 4.1; Reference 65 at Pages 1-2; Reference 66 at Sections 1, 3 (describing the database of Wi-Fi access points used to provide location services to users).
1b.	accessing a reference database to obtain information specifying a recorded location for each observed WiFi access point;	PlaceLab provides for wireless devices to access a locally stored or remote database of Wi-Fi access points for all access points in a target area. <i>See</i> generally, and <i>inter alia</i> , Reference 65 at Pages 1, 2, Reference 49 in Sections 1, 2, 4.1; Reference 66 in Sections 3 (each describing collecting Wi-Fi access point information for large geographic areas or cities/towns).
1c.	using the recorded location information for each of the observed WiFi access points in conjunction with predefined rules to determine whether an observed WiFi access point should be included or excluded from a set of WiFi access points;	PlaceLab provides for wireless devices to access a locally stored or remote database of Wi-Fi access points for all access points in a target area and take account of access points moving by limiting a database to a particular target area and using statistical information to ensure high quality and exclusion of erroneous access point readings. <i>See</i> generally, and <i>inter alia</i> , Reference 49 in Section 4.1; Reference 65 at Page 2, Reference 66 in Section 3.

Claim element	'897 Patent Claim Language	Each element is found in the PlaceLab product/initiative as shown by the Prior Art Reference Nos. 49,65, 66
1d.	using the recorded location information of only the WiFi access points included in the set and omitting the recorded location information of the excluded WiFi access points to calculate the geographical position of the WiFi-enabled device.	PlaceLab may exclude recorded Wi-Fi access point information for access points that have moved outside of a geographic area that is currently being used for location determination. <i>See</i> generally, and <i>inter alia</i> , Reference 49 in Section 4.1; Reference 65 at Page 2, Reference 66 in Section 3.
2	The method of claim 1 further including recording signal strength information for WiFi access points included in the set	PlaceLab converts access point identification information and received signal strengths into a location for the Wi-Fi enabled user device. <i>See</i> generally, and <i>inter alia</i> , Reference 65 at page 2 and Reference 49 at Section 2.
	and using the signal strength information when calculating the geographical position of the WiFi-enabled device.	PlaceLab converts access point identification information and received signal strengths into a location for the Wi-Fi enabled user device. <i>See</i> generally, and <i>inter alia</i> , Reference 65 at page 2 and Reference 49 at Section 2.
3	The method of claim 1 wherein the predefined rules include rules to determine a reference point and to compare the recorded location information for each of the observed WiFi access points to the reference point,	PlaceLab may exclude recorded Wi-Fi access point information for access points that have moved outside of a geographic area that is currently being used for location determination, i.e. they exceed a threshold distance from a reference point for the target area. <i>See</i> generally, and <i>inter alia</i> , Reference 49 in Section 4.1; Reference 65 at Page 2, Reference 66 in Section 3.
	and wherein WiFi access points having a recorded location within a predefined threshold distance of the reference point are included in the set and wherein WiFi access points having a recorded location in excess of the predefined threshold distance of the reference point are excluded from the set.	PlaceLab may exclude recorded Wi-Fi access point information for access points that have moved outside of a geographic area that is currently being used for location determination, i.e. they exceed a threshold distance from a reference point for the target area. <i>See</i> generally, and <i>inter alia</i> , Reference 49 in Section 4.1; Reference 65 at Page 2, Reference 66 in Section 3.

Claim element	'897 Patent Claim Language	Each element is found in the PlaceLab product/initiative as shown by the Prior Art Reference Nos. 49,65, 66
4	The method of claim 3 wherein the reference point is determined by identifying a cluster of WiFi access points and determining an average position of the WiFi access points in the cluster.	PlaceLab may exclude recorded Wi-Fi access point information for access points that have moved outside of a geographic area that is currently being used for location determination, i.e. they exceed a threshold distance from a reference point for the target area. <i>See generally</i> , and <i>inter alia</i> , Reference 49 in Section 4.1; Reference 65 at Page 2, Reference 66 in Section 3.

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102 Invalidity Chart for Patent: 7,474,897
Prior Art: 7,440,755 (Balachandran, et al.)

Claim element	' 987 Patent Claim Language	Anticipatory Language from the '755 Patent
1	In a location-based services system for WiFi-enabled devices, a method of calculating the position of WiFi-enabled devices comprising the acts of:	The '755 patent describes a Wi-Fi location server and databases for accurately determining the position of an end user using a wireless local area network (WLAN). <i>See</i> '755 patent generally, and <i>inter alia</i> , at 1:46-60.
1a.	a WiFi-enabled device communicating with WiFi access points within range of the WiFi-enabled device so that observed WiFi access points identify themselves;	The '755 patent describes a system that includes a WLAN notification message generator that sends a notification to the mobile terminal indicating that the mobile terminal is within range of the WLAN. <i>See</i> '755 patent generally, and <i>inter alia</i> , at 1:61-2:10, 5:16-25 (IEEE 802.11 requires access points to include identifying information in WLAN messages).
1b.	accessing a reference database to obtain information specifying a recorded location for each observed WiFi access point;	The '755 Patent describes that the cellular network maintains a database that correlates known WLANs with locations in the coverage area. <i>See</i> '755 patent generally, and <i>inter alia</i> , at '755 patent, 4:26-28, 5:16-25.
1c.	using the recorded location information for each of the observed WiFi access points in conjunction with predefined rules to determine whether an observed WiFi access point should be included or excluded from a set of WiFi access points;	The '755 Patent describes using received signal strength, angle of arrival, time of arrival and other positioning calculations involving particular access points to determine location. <i>See</i> '755 patent generally, and <i>inter alia</i> , at '755 patent, 4:26-28, 5:16-25, 5:30-38, 5:49-53, 6:50-56, 7:48-54, 7:54-8:35.
1d.	using the recorded location information of only the WiFi access points included in the set and omitting the recorded location information of the excluded WiFi access points to calculate the geographical position of the WiFi-enabled device.	The '755 Patent describes using received signal strength, angle of arrival, time of arrival and other positioning calculations involving particular access points to determine location. <i>See</i> '755 patent generally, and <i>inter alia</i> , at '755 patent, 4:26-28, 5:16-25, 5:30-38, 5:49-53, 6:50-56, 7:48-54, 7:54-8:35.

2	The method of claim 1 further including recording signal strength information for WiFi access points included in the set	The '755 Patent describes using received signal strength, angle of arrival, time of arrival and other positioning calculations involving particular access points to determine location. <i>See</i> '755 patent generally, and <i>inter alia</i> , at '755 patent, 4:26-28, 5:16-25, 5:30-38, 5:49-53, 6:50-56, 7:48-54, 7:54-8:35.
	and using the signal strength information when calculating the geographical position of the WiFi-enabled device.	The '755 Patent describes using received signal strength, angle of arrival, time of arrival and other positioning calculations involving particular access points to determine location. <i>See</i> '755 patent generally, and <i>inter alia</i> , at '755 patent, 4:26-28, 5:16-25, 5:30-38, 5:49-53, 6:50-56, 7:48-54, 7:54-8:35.
3	The method of claim 1 wherein the predefined rules include rules to determine a reference point and to compare the recorded location information for each of the observed WiFi access points to the reference point,	The '755 Patent describes using received signal strength, angle of arrival, time of arrival and other positioning calculations involving particular access points to determine a reference point such as a cellid or other location. <i>See</i> '755 patent generally, and <i>inter alia</i> , at '755 patent, 4:26-28, 5:16-25, 5:30-38, 5:49-53, 6:50-56, 7:48-54, 7:54-8:35, 9:62-67.
	and wherein WiFi access points having a recorded location within a predefined threshold distance of the reference point are included in the set and wherein WiFi access points having a recorded location in excess of the predefined threshold distance of the reference point are excluded from the set.	The '755 Patent describes using received signal strength, angle of arrival, time of arrival and other positioning calculations involving particular access points to determine a reference point such as a cellid or other location. <i>See</i> '755 patent generally, and <i>inter alia</i> , at '755 patent, 4:26-28, 5:16-25, 5:30-38, 5:49-53, 6:50-56, 7:21-27, 7:48-54, 7:54-8:35, 9:62-67.
4	The method of claim 3 wherein the reference point is determined by identifying a cluster of WiFi access points and determining an average position of the WiFi access points in the cluster.	The '755 Patent describes using received signal strength, angle of arrival, time of arrival and other positioning calculations involving particular access points to determine a reference point within a cellid or multiple cellids or locations. <i>See</i> '755 patent generally, and <i>inter alia</i> , at '755 patent, 4:26-28, 4:45-63, 5:16-25, 5:30-38, 5:49-53, 6:50-56, 7:21-27, 7:48-54, 7:54-8:35, 9:62-67.

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Case no. 10-cv-11571-RWZ (D. Mass.)

103 Invalidity Chart for Patent: 7,414,988

Prior Art: 7,257,411 (Gwon, et al.); 7,389,114 (Ju et al.); 7,130,646 (Wang); 7,440,755
(Balachandran et al.)

Claim element	'988 Patent Claim Language	Relevant Language from the '646, '411, '755 and '114 Patents
1	A Wi-Fi location server, comprising:	<i>See</i> '646, '411, '114 and '646 Patent citations to Wi-Fi location servers.
	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	<i>See</i> '646, '411 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts. <i>See also</i> '711 Patent at 2:11-23 (describing target areas based on cellular coverage).
	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	<i>See</i> '646, '411 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts.
	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	<i>See</i> '646, '411 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts.
	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the Wi-Fi access point so that the multiple readings have reference symmetry relative to other Wi-Fi access points in the target area and so that the calculation of the position of the Wi-Fi access point avoids arterial bias in the calculated position information; and	<i>See</i> '646, '411 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts.
	computer-implemented logic to add records to the database for newly-discovered Wi-Fi access points said computer logic	<i>See</i> '646, '411 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts.

Claim element	'988 Patent Claim Language	Relevant Language from the '646, '411, '755 and '114 Patents
	including logic to recalculate position information for Wi-Fi access points previously stored in the database to utilize position information for the newly-discovered readings of previously stored Wi-Fi access points.	
2	The server of claim 1 further including computer-implemented clustering logic to identify position information based on error prone GPS information.	<i>See</i> '646, '411 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and the '114 Patent generally, and <i>inter alia</i> at '114 patent, 6:63-7:2 (regarding using statistics on more multiple signal measurements).
3	The server of claim 2 wherein the clustering logic includes logic to determine a weighted centroid position for all position information reported for an access point	<i>See</i> '646, '411 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and the '114 Patent generally, and <i>inter alia</i> at '411 patent, 8:2-5, 47-57 (describing techniques for smaller estimation errors and centroids), '114 patent at 6:63-7:2, (regarding using statistics on more multiple signal measurements).
	and logic to identify position information that exceeds a statistically-based deviation threshold amount away from the centroid position and excludes such deviating position information from the database and from influencing the calculated positions of the Wi-Fi access points.	<i>See</i> '646, '411 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and the '114 Patent generally, and <i>inter alia</i> at '411 patent, 8:2-5, 47-57, 14:29-36 (advanced filtering schemes for lower estimation errors and alternative weighting criteria), '114 patent at 6:63-7:2, (regarding using statistics on more multiple signal measurements).

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103 Invalidity Chart for Patent: 7,414,988

Prior Art: 7,130,646 (Wang) in view of Lorincz et al., *MoteTrack: A Robust, Decentralized Approach to RF-Based Location Tracking* (2005)

Claim element	'988 Patent Claim Language	Relevant Language from '646 Patent and Lorcinz
1	A Wi-Fi location server, comprising:	<p><i>See</i> '646 Patent citations to Wi-Fi location servers.</p> <p>See Lorincz generally and at 64 (describing RF-based localization, a product called MoteTrack, to measure, store, and compute location information. Location tracking is based on empirical measurements of radio signals from multiple transmitters, using an algorithm similar to RADAR, which is another wireless locations system).</p>
1a.	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 64 describing multiple nodes.
1b.	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 65 describing recording a database of radio "signatures" along with their known locations for a mobile node to estimate its position by acquiring a signature and comparing it to the known signatures in the database. A weighting scheme can be used to estimate location when multiple signatures are close to the acquired signature.
1c.	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 65, 67 describing recording a database of radio "signatures" along mapping them to locations for a mobile node to estimate its position by acquiring a signature and comparing it to the known signatures in the database. A weighting scheme can be used to estimate location when multiple signatures are close to the acquired signature. The data includes for each access point <i>sourceID</i> which is the beacon node ID, <i>powerLevel</i> which is the transmit power level of the beacon

Claim element	'988 Patent Claim Language	Relevant Language from '646 Patent and Lorcinz
		message, and mean RSSI is the mean received signal strength indication (RSSI) of a set of beacon messages received over some time interval.
1d.	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the Wi-Fi access point so that the multiple readings have reference symmetry relative to other Wi-Fi access points in the target area and so that the calculation of the position of the Wi-Fi access point avoids arterial bias in the calculated position information; and	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 73, 75 describing deploying MoteTrack over one floor of a building, measuring roughly 1742 m ² , with 412 m ² of hallway area and 1330m ² of in-room area with 20 beacon motes (Figure 2) and collecting reference signatures around the access points.
1e.	computer-implemented logic to add records to the database for newly-discovered Wi-Fi access points said computer logic including logic to recalculate position information for Wi-Fi access points previously stored in the database to utilize position information for the newly-discovered readings of previously stored Wi-Fi access points.	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 66 describing how to address perturbations in access point readings.
2	The server of claim 1 further including computer-implemented clustering logic to identify position information based on error prone GPS information.	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 66 describing using the centroid of the nearest signatures and using subsets of signatures.
3	The server of claim 2 wherein the clustering logic includes logic to determine a weighted centroid position for all position information reported for an access point	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 66 -70 describing using the centroid of the nearest signatures and using subsets of signatures.
3a.	and logic to identify position	<i>See</i> '646 Patent citations generally and <i>inter alia</i> ,

Claim element	'988 Patent Claim Language	Relevant Language from '646 Patent and Lorcinz
	information that exceeds a statistically-based deviation threshold amount away from the centroid position and excludes such deviating position information from the database and from influencing the calculated positions of the Wi-Fi access points.	as set forth in the anticipation charts, and Lorcinz generally and at 66 - 70 describing using the centroid of the nearest signatures and using subsets of signatures.

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103 Invalidity Chart for Patent: 7,414,988

Prior Art: 7,130,646 (Wang) in view of Place Lab and Anthony LaMarca, *Place Lab: Device Positioning Using Radio Beacons in the Wild* (2005)

Claim element	'988 Patent Claim Language	Relevant Language from the '646 Patent and Place Lab
1	A Wi-Fi location server, comprising:	See '646 Patent and Place Lab citations to Wi-Fi location servers.
1a.	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	See '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing target locations of cities or geographic areas and Lamarca at 121.
1b.	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	See '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing databases for access including Wi-Fi access points in target areas.
1c.	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	See '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing target locations of cities or geographic areas and Lamarca generally and <i>inter alia</i> at 122 describing wgle.net is the largest of the 802.11 war-driving repositories, and contains over 2 million known AP positions, and the recent "World Wide War-drive" added 275,000 new access points over an 8 day period (worldwidewardrive.org).
1d.	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the Wi-Fi access point so that the multiple readings have reference symmetry relative to other Wi-Fi access points in the target area and so that the calculation of the position of the Wi-Fi access point avoids arterial bias in the calculated position information;	See '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing target locations of cities or geographic areas and Lamarca generally and <i>inter alia</i> at 121, 122, 129 (describing wgle.net is the largest of the 802.11 war-driving repositories, and contains over 2 million known AP positions, and the recent "World Wide War-drive" added 275,000 new access points over an 8 day period (worldwidewardrive.org) and recording multiple readings around the access points in the databases. Each war-driving trace is a time-coded sequence of records containing the latitude and longitude of

Claim element	'988 Patent Claim Language	Relevant Language from the '646 Patent and Place Lab
	and	where the record was taken, as well as the list of radio sources and associates signal strengths that could be heard at that time. By pooling their war drives together and applying some simple averaging, these groups have produced estimated locations for millions of beacons. Public domain war-driving software has been developed for most computing platforms, and there are many aggregation websites to which war-drives can be submitted. While war-driving has traditionally been performed in order to provide information about where nearby network access can be obtained, Place Lab uses these maps in reverse to infer where we are given a particular beacon is nearby.)
1e.	computer-implemented logic to add records to the database for newly-discovered Wi-Fi access points said computer logic including logic to recalculate position information for Wi-Fi access points previously stored in the database to utilize position information for the newly-discovered readings of previously stored Wi-Fi access points.	See '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts.
2	The server of claim 1 further including computer-implemented clustering logic to identify position information based on error prone GPS information.	See '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing target locations of cities or geographic areas and Lamarca generally and <i>inter alia</i> at '646 patent, 6:34-40 (a client receives a stronger signal from the access point when it is closer to that access point) and LaMarca generally and at 129 describing GPS and the use of a Bayesian particle filter tracker with a sensor model that exploits the fact that observed signal strength and beacon-frame loss rate correlate with distance. These per-beacon parameters allow the tracker to predict location more accurately than our untrained models.

Claim element	'988 Patent Claim Language	Relevant Language from the '646 Patent and Place Lab
3	The server of claim 2 wherein the clustering logic includes logic to determine a weighted centroid position for all position information reported for an access point	<i>See</i> '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts and '646 patent, <i>inter alia</i> , describing weighted nearby access points and LaMarca's use of Bayesian statistics at, <i>inter alia</i> , 129.
3a.	and logic to identify position information that exceeds a statistically-based deviation threshold amount away from the centroid position and excludes such deviating position information from the database and from influencing the calculated positions of the Wi-Fi access points.	<i>See</i> '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts and '646 patent, <i>inter alia</i> , at 7:20-35 describing using the strongest signal paths and LaMarca's use of Bayesian statistics at, <i>inter alia</i> , 128, 129.

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103 Invalidity Chart for Patent: 7,433,694

Prior Art: 7,130,646 (Wang) in view of Lorincz et al., MoteTrack: *A Robust, Decentralized Approach to RF-Based Location Tracking* (2005)

Claim element	'694 Patent Claim Language	Relevant Language from the '646 Patent and Lorcinz
1	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	See '646 Patent citations to Wi-Fi location servers and target areas. See Lorincz generally and at 64 (describing RF-based localization, a product called MoteTrack, to measure, store, and compute location information. Location tracking is based on empirical measurements of radio signals from multiple transmitters, using an algorithm similar to RADAR, which is another wireless locations system and general references to target areas).
1a.	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	See '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 64, 65 describing recording a database of radio "signatures" along with their known locations for a mobile node to estimate its position by acquiring a signature and comparing it to the known signatures in the database.
1b.	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	See '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 65, 67 describing recording a database of radio "signatures" along mapping them to locations for a mobile node to estimate its position by acquiring a signature and comparing it to the known signatures in the database. A weighting scheme can be used to estimate location when multiple signatures are close to the acquired signature. The data includes for each access point <i>sourceID</i> which is the beacon node ID, <i>powerLevel</i> which is the transmit power level of the beacon message, and mean RSSI is the mean received signal strength indication (RSSI) of a set of beacon messages received over some time interval.

Claim element	'694 Patent Claim Language	Relevant Language from the '646 Patent and Lorcinz
1c.	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the Wi-Fi access point so that the multiple readings avoid arterial bias in the calculated position information of the Wi-Fi access point,	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 73, 75 describing deploying MoteTrack over one floor of a building, measuring roughly 1742 m ² , with 412 m ² of hallway area and 1330m ² of in-room area with 20 beacon motes (Figure 2) and collecting reference (over 480) signatures around the access points.
1d.	and wherein the database records for substantially all Wi-Fi access points in the target area provide reference symmetry within the target area.	<i>See</i> '646 Patent citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and Lorcinz generally and at 73, 75 describing deploying MoteTrack over one floor of a building, measuring roughly 1742 m ² , with 412 m ² of hallway area and 1330m ² of in-room area with 20 beacon motes (Figure 2) and collecting reference (over 480) signatures around the access points.
2	The database of claim 1 having database records for a plurality of target areas,	<i>See</i> '646 Patent citations to Wi-Fi location servers and target areas in the anticipation charts. In MoteTrack, a building or other area includes beacon nodes in a database for that area.
2a.	said database records being organized by target areas.	<i>See</i> '646 Patent citations to Wi-Fi location servers and target areas in the anticipation charts. In MoteTrack, a building or other area includes beacon nodes in a database for that area. <i>See</i> Lorincz generally and at 67.

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103 Invalidity Chart for Patent: 7,433,694

Prior Art: 7,130,646 (Wang) in view of Anthony LaMarca, *Place Lab: Device Positioning Using Radio Beacons in the Wild* (2005)

Claim element	'694 Patent Claim Language	Relevant Language from '646 Patent and Place Lab
1	A database of Wi-Fi access points for at least one target area having a radius on the order of tens of miles,	<i>See</i> '646 Patent and Place Lab citations to Wi-Fi location servers.
1a.	said database being recorded in a computer-readable medium and including database records for substantially all Wi-Fi access points in the target area,	<i>See</i> '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing target locations of cities or geographic areas and LaMarca generally and <i>inter alia</i> at 121, 122 describing wgle.net is the largest of the 802.11 war-driving repositories, and contains over 2 million known AP positions, and the recent "World Wide War-drive" added 275,000 new access points over an 8 day period (worldwidewardrive.org).
1b.	each record including identification information for a corresponding Wi-Fi access point and calculated position information for the corresponding Wi-Fi access point,	<i>See</i> '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing target locations of cities or geographic areas and LaMarca generally and <i>inter alia</i> at 121, 122, 129 (describing wgle.net is the largest of the 802.11 war-driving repositories, and contains over 2 million known AP positions, and the recent "World Wide War-drive" added 275,000 new access points over an 8 day period (worldwidewardrive.org) and recording multiple readings around the access points in the databases. Each war-driving trace is a time-coded sequence of records containing the latitude and longitude of where the record was taken, as well as the list of radio sources and associates signal strengths that could be heard at that time. By pooling their war drives together and applying some simple averaging, these groups have produced estimated locations for millions of beacons. Public domain war-driving software has been developed for most computing platforms, and there are many

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		aggregation websites to which war-drives can be submitted. While war-driving has traditionally been performed in order to provide information about where nearby network access can be obtained, Place Lab uses these maps in reverse to infer where we are given a particular beacon is nearby.)
1c.	wherein said calculated position information is obtained from recording multiple readings of the Wi-Fi access point at different locations around the Wi-Fi access point so that the multiple readings avoid arterial bias in the calculated position information of the Wi-Fi access point,	<i>See</i> '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing target locations of cities or geographic areas and Lamarca generally and <i>inter alia</i> at 121, 122, 128, 129 (describing wgle.net is the largest of the 802.11 war-driving repositories, and contains over 2 million known AP positions, and the recent "World Wide War-drive" added 275,000 new access points over an 8 day period (worldwidewardrive.org) and recording multiple readings around the access points in the databases. Each war-driving trace is a time-coded sequence of records containing the latitude and longitude of where the record was taken, as well as the list of radio sources and associates signal strengths that could be heard at that time. By pooling their war drives together and applying some simple averaging, these groups have produced estimated locations for millions of beacons. Public domain war-driving software has been developed for most computing platforms, and there are many aggregation websites to which war-drives can be submitted. While war-driving has traditionally been performed in order to provide information about where nearby network access can be obtained, Place Lab uses these maps in reverse to infer where we are given a particular beacon is nearby.)
1d.	and wherein the database records for substantially all Wi-Fi access points in the target area provide reference symmetry within the target area.	<i>See</i> '646 Patent and Place Lab citations generally and <i>inter alia</i> , as set forth in the anticipation charts, and describing target locations of cities or geographic areas and Lamarca generally and <i>inter alia</i> at 121, 122, 128, 129 (describing wgle.net is the largest of the 802.11 war-driving repositories, and contains over 2 million known AP positions,

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		and the recent "World Wide War-drive" added 275,000 new access points over an 8 day period (worldwidewardrive.org) and recording multiple readings around the access points in the databases providing symmetry.
2	The database of claim 1 having database records for a plurality of target areas,	<p><i>See</i> '646 Patent and Place Lab citations generally and <i>inter alia</i>, as set forth in the anticipation charts, and describing target locations of cities or geographic areas and '646 describing target cities (Tokyo) and local points of interest and Lamarca generally and <i>inter alia</i> at 127 describing cities and other geographic areas including</p> <ul style="list-style-type: none"> • Downtown Seattle – a mix of commercial and residential urban high-rises • Seattle's Ravenna neighborhood – a medium-density residential neighborhood • Kirkland, Washington – a sparse suburb of single-family homes
2a.	said database records being organized by target areas.	<p><i>See</i> '646 Patent and Place Lab citations generally and <i>inter alia</i>, as set forth in the anticipation charts, and describing target locations of cities or geographic areas and '646 describing target cities (Tokyo) and local points of interest and Lamarca generally and <i>inter alia</i> at 127 describing cities and other geographic areas including</p> <ul style="list-style-type: none"> • Downtown Seattle – a mix of commercial and residential urban high-rises • Seattle's Ravenna neighborhood – a medium-density residential neighborhood • Kirkland, Washington – a sparse suburb of single-family homes